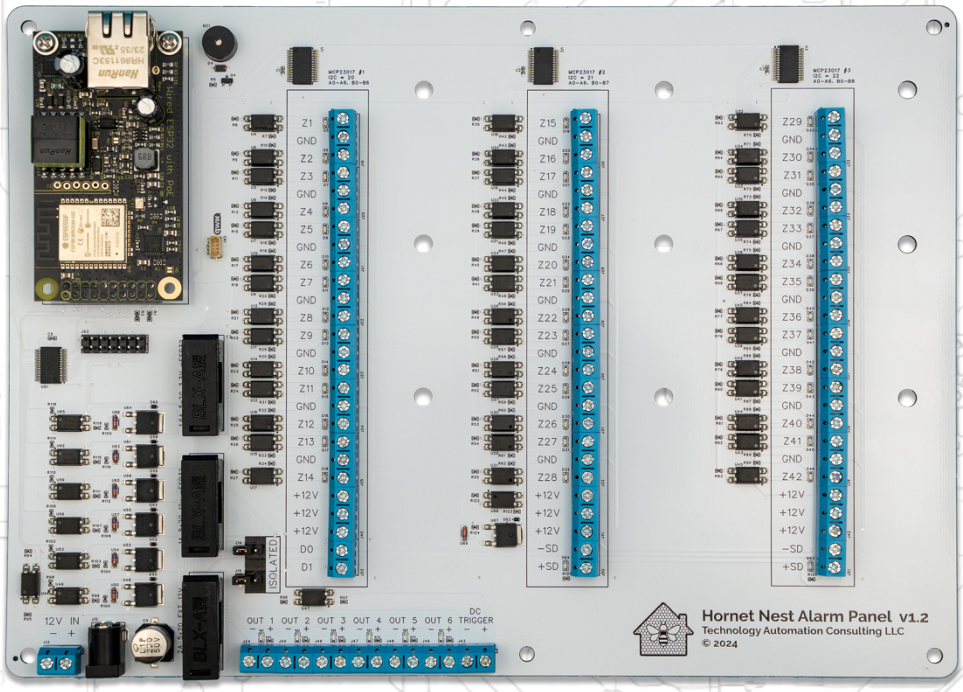
HORNET NEST ALARM PANEL

INSTALLATION & USER MANUAL



VERSION 1.2 | INFORMATION SUBJECT TO CHANGE WITHOUT

1 SAFETY DISCLOSURES

The Hornet Nest Alarm Panel is a powerful tool for integrating traditional wired sensors and devices into modern home automation systems. While it is designed for ease of installation and use, it is important to understand its intended use and limitations:

⚠ Not for Life-Safety Use

This product is **not certified** by any nationally recognized testing laboratory (NRTL), such as UL or ETL, for use in **life safety applications**. It has not undergone formal third-party evaluation for compliance with fire alarm, burglar alarm, or security control panel standards. It is intended for **DIY enthusiasts, home automation hobbyists, and tech-savvy users** who understand and accept the risks associated with using non-certified equipment in their home systems.

Intended Use

The Hornet Nest Panel is built for integration with platforms like **Home Assistant** using **ESPHome**, enabling flexible automation and monitoring. It supports a wide range of sensors and devices, and provides advanced capabilities such as zone monitoring, trigger outputs, and local logic execution. It is not a replacement for code-compliant security or fire protection systems required in commercial or regulated residential settings.

Use at Your Own Risk

By installing and using this product, you acknowledge that:

- It is not approved for installation where **UL certification or code-compliant systems** are required.
- It should not be used as the sole means of detecting fire, smoke, gas leaks, break-ins, or other critical events.
- You are responsible for ensuring that your installation complies with **local building codes, electrical standards, and insurance requirements**.

Installation Guidance

Only individuals who are familiar with low-voltage electronics and safe wiring practices should install or modify this product. If you're uncertain, consult with a qualified professional.

2 INTRODUCTION TO THE HORNET NEST

Welcome to the Hornet Nest Alarm Panel

Thank you for choosing the Hornet Nest Alarm Panel—an open-source, feature-rich alarm integration platform designed for **Home Assistant and ESPHome** enthusiasts. Whether you're retrofitting a legacy security system or building a smart home from the ground up, the Hornet Nest provides unmatched flexibility, expandability, and control.

At its core, the Hornet Nest is built around the powerful wESP32 module, enabling seamless connectivity via Ethernet, Power over Ethernet (PoE), or traditional 12V power. With support for up to 42 opto-isolated input zones, multiple output types, Wiegand keypad integration, and Qwiic connectivity for expansion, the Hornet Nest adapts to both simple and complex installations with ease.

This manual will walk you through installation, configuration, and usage. Whether you're a first-time user or a seasoned integrator, you'll find guidance to help you get the most out of your Hornet Nest system.

Let's get started.

3 TECHNICAL SPECIFICATIONS

	Hornet Nest Alarm Panel
Input Zones	42 optoisolated zones
Outputs	6 MOSFET-controlled outputs (12V devices)
Additional Outputs	6x 3.3V trigger outputs, 5x wESP32 I/Os
Smoke Detector Reset	MOSFET-controlled 12V reset for 4-wire smoke detectors
Power Options	PoE-enabled, external 12 V DC, or USB Type-C wESP32 module
Status Indicators	Individual zone & output indicators
Open Source	Fully open source with GPL and MIT licensing
Firmware	Pre-flashed with ESPHome
Keypad Support	Wiegand keypad support
Expandable Zones	Qwiic expansion connector for additional functionality
Power Input Features	Fused with flexible input options
Sensing Trigger	3-23 V DC

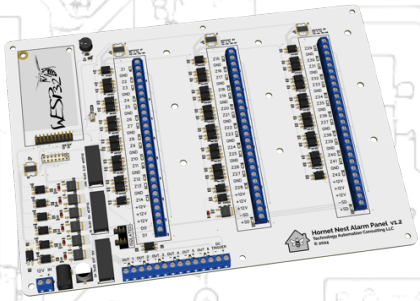
POWER SPECIFICATIONS	
3.3v Logic	6W (1.81 amps)
Maximum 12v via POE	12.95W (1.08 amps)
Available 12v via POE	10.8W (.9 amps)
Maximum 12v via External Power Supply	Up to 30W (2.5 amps)
Available 12v via External Power Supply	Up to 27.8W (2.32 amps)

Exceeding the available power limits of the Hornet Nest Alarm Panel may result in permanent damage to the hardware. Always ensure that connected devices draw current within the specified ratings for each output and that your power supply is properly sized.

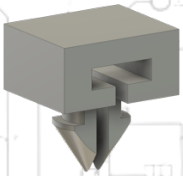
Failure to observe these requirements can lead to overheating, board failure, or irreversible damage to the Hornet Nest panel or the wESP32 module. Carefully review all power specifications before installation.

4 WHAT'S IN THE PACKAGE?

- Hornet Nest Alarm Panel (x1)



- PCB Cable Tie Clips (x11)

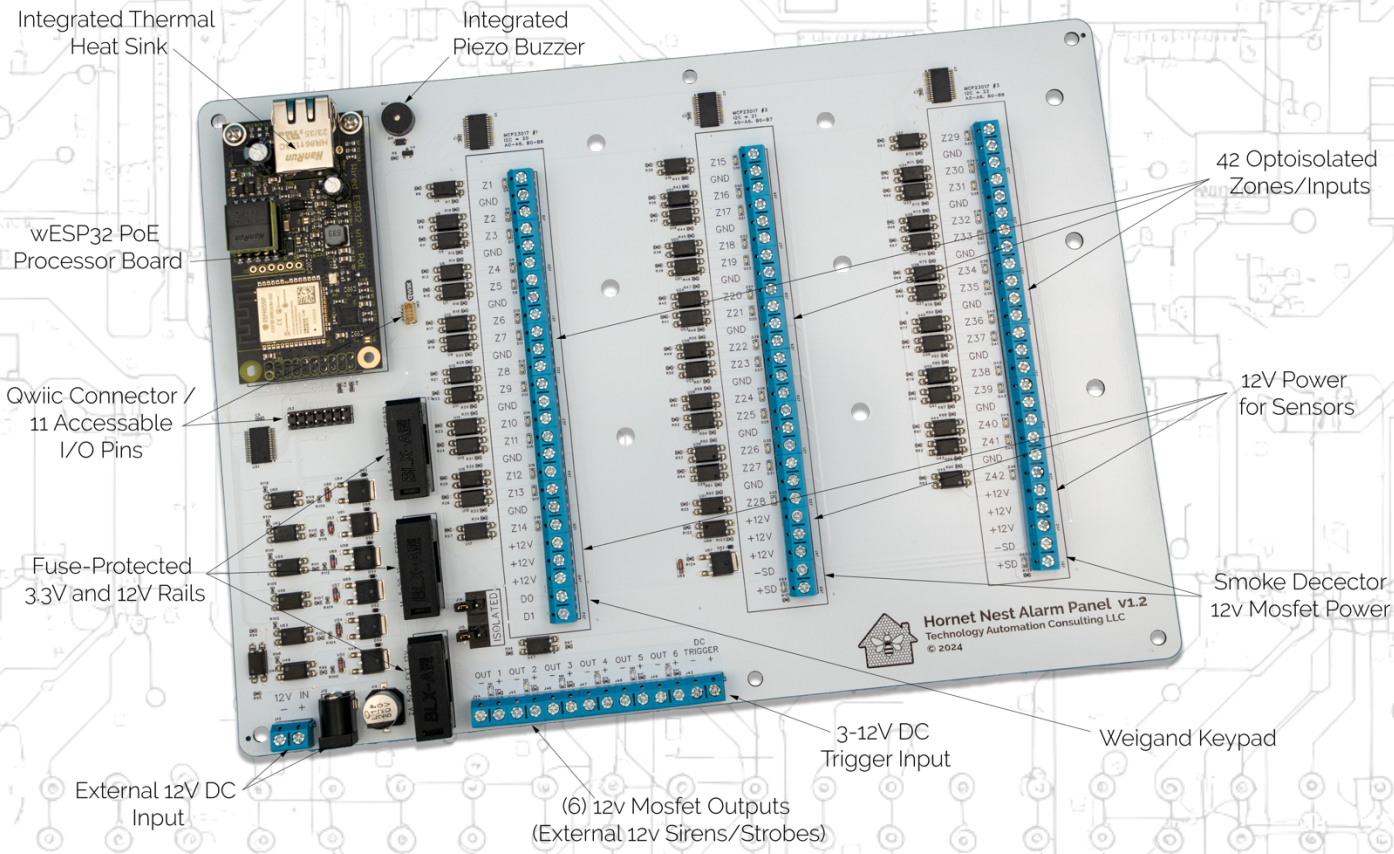


- M4x8mm PCB Stand-offs (x8)

- Cable Ties (x18)
- Extra Fuses (x3)

5 HARDWARE

5.1 PHYSICAL SPECIFICATION



The Hornet Nest Alarm Panel is thoughtfully engineered to fit neatly into typical alarm enclosures while offering ample space and clearly labeled connections for ease of installation and service. Below are the key physical specifications of the board:

Board Dimensions

- Length: 262 mm (10.31 in)
- Width: 188 mm (7.40 in)
- PCB Thickness: 1.6 mm (standard FR4)

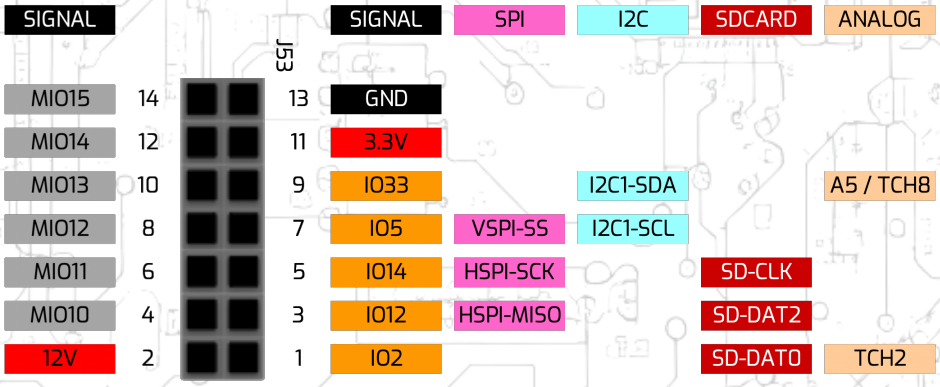
Mounting

- Designed to fit in standard alarm enclosures
- Six mounting holes positioned for secure attachment
- Compatible with M4 adhesive-backed standoffs (not included)

Environmental Ratings

- Operating Temperature: 0°C to 50°C (32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Humidity: 10% to 90% non-condensing (indoor use only)

5.2 GPIO HEADER FOOTPRINT

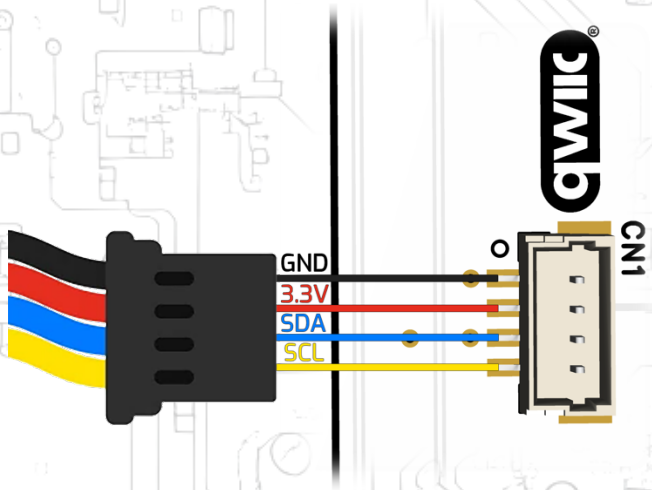


5.3 QWIIC CONNECTOR

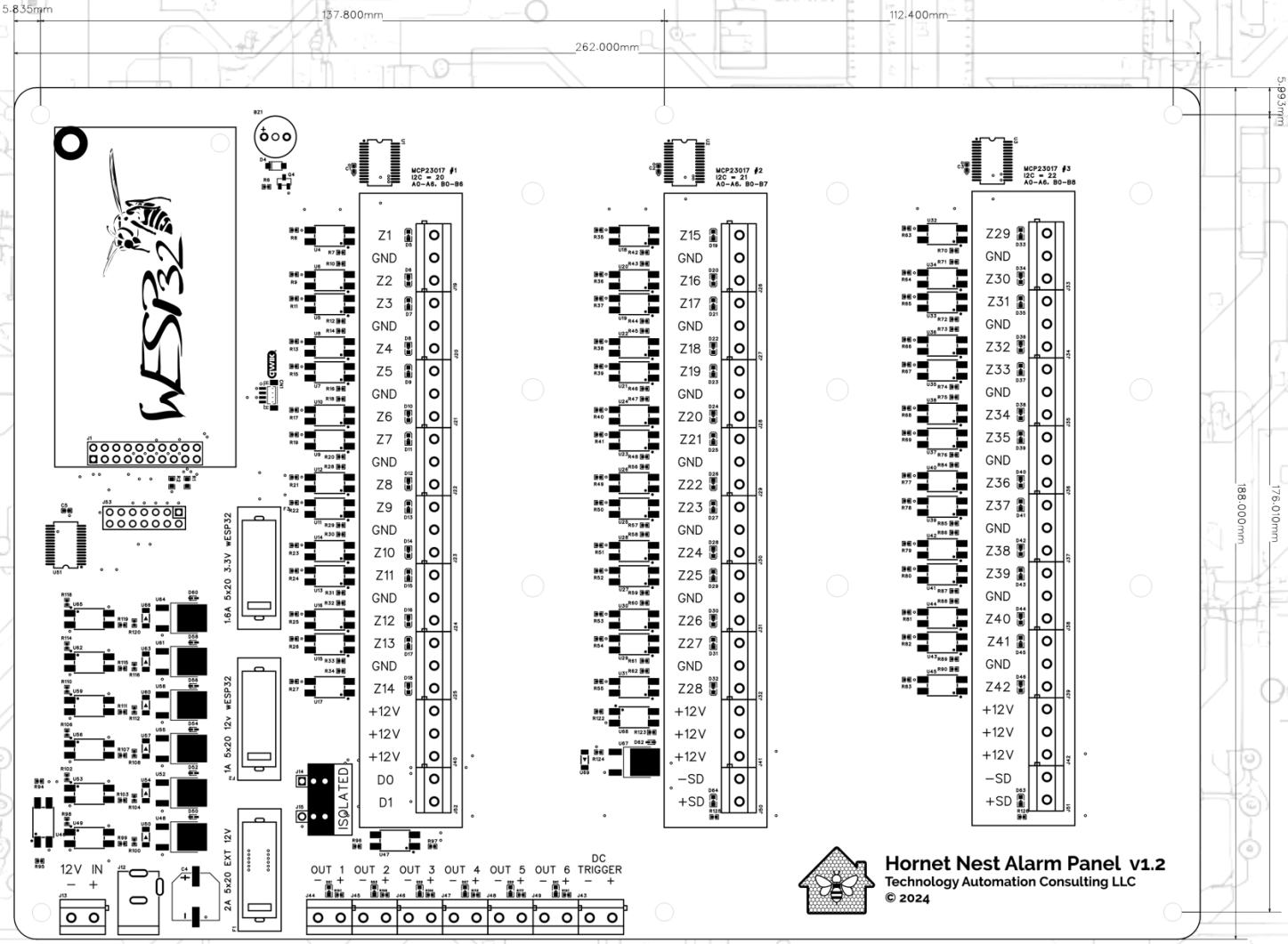
The Qwiic system, created by SparkFun Electronics, is a plug-and-play connectivity standard designed to simplify electronic prototyping. By utilizing 4-pin JST SH connectors and cables, it enables effortless connections between I2C-compatible sensors, displays, and other modules—eliminating the need for soldering or complex wiring. With features like daisy-chaining capability, polarized connectors to avoid incorrect connections, and a solder-free design, Qwiic streamlines IoT development, making prototyping faster and more accessible for users.

This connector can be used to expand functionality by adding future expansion boards from the Hornet Nest product line as well as a variety of sensors and breakout boards from other manufacturers.

Standard Qwiic Pinout



5.4 MECHANICAL DIMENSIONS



5.5 wESP32™ CORE MODULE

The wESP32 is a powerful ESP32-based module designed to support Power over Ethernet (PoE) and provide robust connectivity for embedded applications. It serves as the core processing unit for the Hornet Nest Alarm Panel, enabling seamless integration with ESPHome and Home Assistant ecosystems. The Hornet Nest board is specifically designed to interface directly with the wESP32, supplying power and connectivity while exposing its I/O for expanded functionality.

For detailed specifications, documentation, and support, please visit the official wESP32 project page at https://wesp32.com.

6 WIRING

6.1 IDENTIFICATION OF EXISTING WIRING

If you're retrofitting an existing wired alarm system, one of the first and most important steps is to correctly identify the purpose of each wire in your panel. Many older security systems use similar wiring conventions, and understanding how each wire was originally used will make for a smooth transition to the Hornet Nest Alarm Panel.

Step 1: Photograph and Label Everything

Before disconnecting anything, take **clear, detailed photos** of your existing alarm panel and all connected wires. Label the cables and document where each one is connected. This will be valuable if you need to reference the original setup or if you run into issues during the reinstallation process.

Step 2: Understand Common Wiring Patterns

Here's how to identify common devices by their wire types and characteristics:

Zone Identification

The wires from various sensors often terminate in a "home run" configuration, meaning each device has its own set of wires that run back to the control panel. In other setups, wires may be daisy-chained or combined into shared zones.

If you have "daisy-chained" zones, you may consider separating them into individual circuits to have zones for each window/door instead of a single zone for an entire room(s) for example.

Tips for identifying zones:

- Look for labeling at the wire ends (e.g., "Front Door," "Living Room Motion").
- If unlabeled, use a continuity tester or multimeter to determine which sensor corresponds to which wire.
- Have someone open or close windows/doors while checking continuity to trace them.

Door and Window Sensors

- Typically use **2-conductor cable** (commonly red and black or white and black).
- These wires are connected to magnetic contact switches.
- You may see one cable per sensor or several sensors "daisy-chained" together in a series loop. If you have "daisy-chained" zones, you may consider separating them into individual circuits to have zones for each window/door instead of a single zone for an entire room(s) for example.
- Some legacy systems include resistors wired at the end of a zone loop for tamper detection. The Hornet Nest supports systems with **single EOL resistors up to 10kΩ**, so these do not need to be removed in most cases. However, if these resistors are installed at the zone terminal block, they can be safely removed.
- Dual EOL resistor zone configurations are **not** supported.

Motion Sensors

- Often wired with **4-conductor cable**.
- Usually include power (12V and ground) and two signal wires for the alarm output.
- Look for wires labeled "+", "-", "NC" or "NO", and "COM" on the motion sensor terminals.
- Most motion detectors are powered devices and will require connection to the 12V and GND terminals on the Hornet Nest.

Glass Break and Shock Sensors

- Use 2 or 4 wires depending on the sensor.
- Passive models function similarly to door/window contacts.
- Powered models will also require 12V and GND connections.

Smoke Detectors (4-wire type only)

- Use **4-conductor cable** for two power wires and two signal wires.
- Most 4-wire smoke detectors are **Normally Open (NO)** and require **power to reset** after activation.
- These are supported by the Hornet Nest's dedicated smoke reset circuit.

Sirens or Sounders

- Typically use **2-conductor cable** and may be labeled as "bell" or "output".
- These devices often require more current and should be connected to one of the MOSFET-controlled outputs on the Hornet Nest.
- Always check the power rating of your siren before connecting.

Keypads (Legacy Panels)

- Older alarm keypads are not compatible with the Hornet Nest Alarm Panel and should be removed or replaced with supported devices such as **Wiegand keypads**.

Wiring Not Needed (Legacy Panels)

- There are some wires that you will not need for the Hornet Nest panel. Some manufacturers might label these as AC, LINE, TEL, TELEPHONE, RING, TIP, or DATA.
- ⚠**Use caution with wires labeled AC or LINE.** These wires could contain voltages that **could cause a lethal shock**. Always disconnect power to the existing panel before beginning to unwire it.

Safety Tip:

Before disconnecting or repurposing any existing wires, ensure that **power is fully removed** from your legacy panel and all circuits. Connecting live wires to the Hornet Nest could cause damage to the board or your components.

6.2 POWER

The Hornet Nest Alarm Panel offers flexible power options and is capable of driving a variety of sensors, relays, keypads, and other 12V devices. However, careful planning and power budgeting are essential to ensure safe and reliable operation.

Power Input Options

- **PoE (Power over Ethernet):** Supplied via the wESP32 module. Delivers up to 12.95W (12V @ 1.08A) under IEEE 802.3af.

- **12V DC Barrel Jack/Power Supply:** Standard 5.5mm x 2.1mm connector (center positive). Required for powering 12V peripherals that exceed the power availability of PoE. Maximum power of 2.5A

Power Budgeting

Each device connected to the Hornet Nest board draws current, and the total power draw must not exceed the available capacity of your chosen power source.

To calculate total system power consumption:

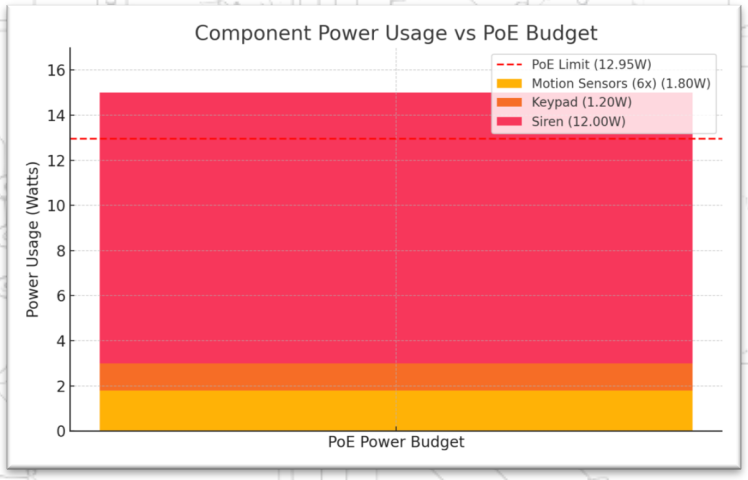
1. **List all connected components** (e.g., motion sensors, door contacts, sirens, keypads).
2. **Determine each device's voltage and current requirements.**
3. **Multiply current by voltage** to find power draw (Watts) for each device.
4. **Add together** all device power draws to determine total system demand.
5. **Ensure that your power supply delivers at least 20% more** than your calculated total to allow for startup surges and overhead.

Example Calculation:

- 6 PIR motion sensors @ 12V / 25mA each = 6 × 0.025A = 0.15A
- 1 Keypad @ 12V / 100mA = 0.1A
- 1 Siren @ 12V / 1A = 1A

  Total: 1.25A @ 12V = 15W

  Recommended supply: 12V @ 1.5A minimum



WARNING

Exceeding the rated current or voltage limits of the Hornet Nest Alarm Panel or the wESP32 module may result in permanent, irreparable damage to the hardware.

Always verify your total power requirements before applying power. Overloading power traces, fuses, or components can lead to failure and void warranty claims.

6.3 CONTACTS / DOORS / WINDOWS

Door and window sensors are among the most basic and widely used components in a security system. These magnetic reed switches operate by opening or closing a circuit when a magnet is moved away from the sensor. The Hornet Nest Alarm Panel is designed to easily integrate with these types of sensors using its opto-isolated zone inputs.

Typical Contact Sensor Behavior

Most contact sensors are **Normally Closed (NC)**, meaning the circuit remains closed (shorted) when the door or window is shut, and opens (disconnects) when it is opened. This behavior allows the system to easily detect an intrusion: an open circuit triggers an alert.

- These sensors typically do **not** require any external power, as they operate by physically opening or closing a dry contact loop.
- Make note of the contact type you have. The default logic provided with the Hornet Nest is configured for Normally Closed (NC) contacts. If your system is different, you will need to make modifications to the default YAML.

Wiring to the Hornet Nest

Each zone has:

- A **Zone Input (Z)** terminal
- A **Shared Common (COM)** terminal

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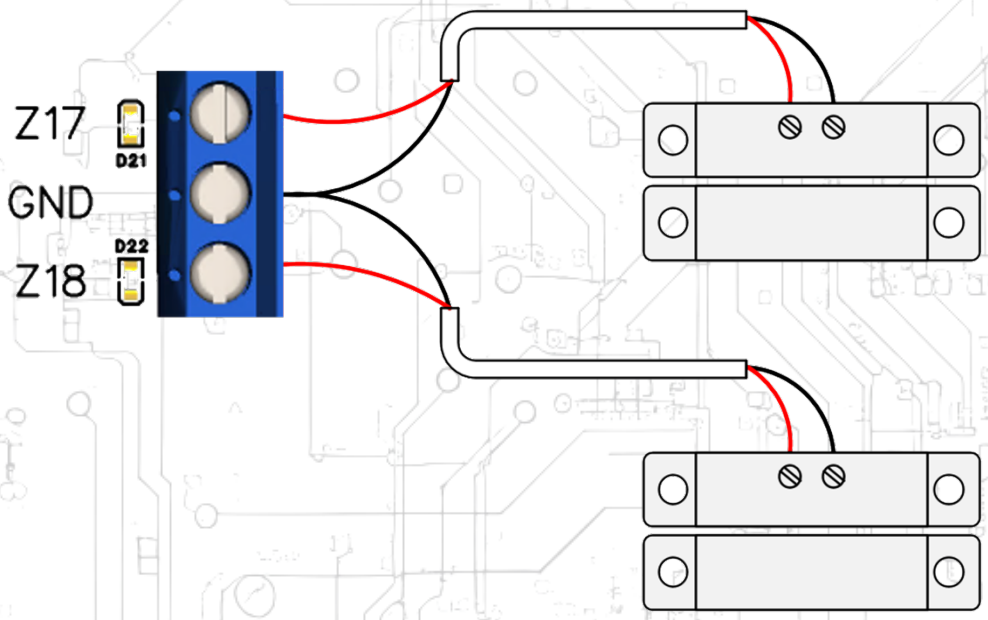
> **Important**: Every **pair of adjacent zones shares a single common terminal**. For example, Zones 1 and 2 share a common ground connection. Be sure to review the terminal layout diagram when planning your wiring.



Example: Connecting Two Contact Sensors

Here's a basic example of wiring two door sensors to Zone 1 and Zone 2:

1. **Zone 1 Sensor**:
    - One wire from the sensor goes to **Zone 1 (Z1)** terminal.
    - The other wire connects to the **shared COM terminal**.
2. **Zone 2 Sensor**:
    - One wire goes to **Zone 2 (Z2)**.
    - The other wire also connects to the same **shared COM terminal** used above.

If using EOL resistors, they should be wired in series at the farthest point from the panel. If you have resistors installed at the original panel, you can safely remove them when installing this panel. The Hornet Nest Alarm Panel does not require EOL resistors but will tolerate them if they are 10k ohm or less and are wired in a single EOL configuration. Dual EOL resistors configurations will **NOT** work with this panel.

Daisy-Chaining Multiple Contacts

If you wish to monitor multiple windows or doors on a single zone, you can connect their sensors in **series**, which means the entire circuit is only closed when **all** sensors are in the closed position. This is ideal for grouping multiple windows in a single room.

6.4 SENSORS / MOTION / WATER LEAK

Motion detectors, glass break sensors, and water leak detectors provide essential detection capabilities for home security and automation. Most of these devices are **passive sensors** that detect environmental changes and relay that data via dry contact outputs, making them well-suited for integration with the Hornet Nest Alarm Panel.

These devices typically use **4-conductor wiring**: two wires provide **12V DC power** (red for positive and black for ground), and two wires form the **detection circuit**—usually a **Normally Closed (NC)** dry contact.

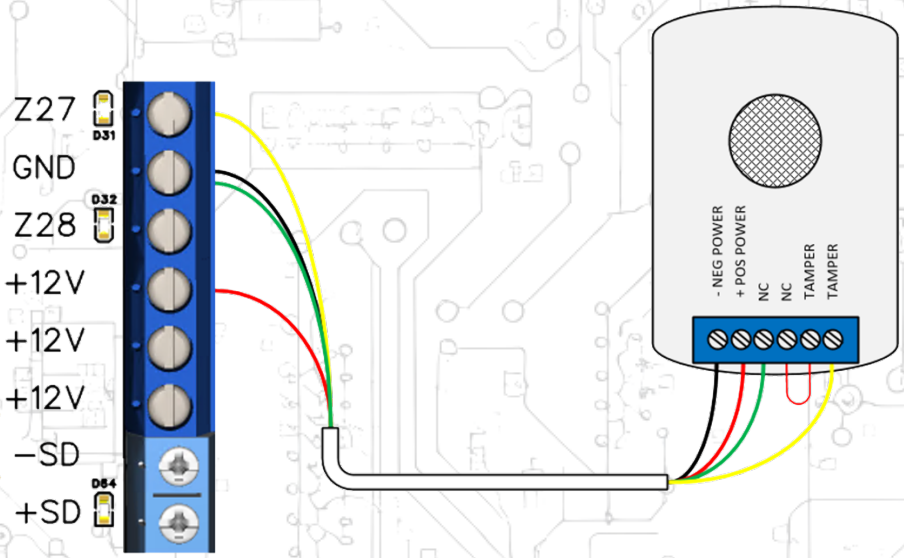
Power Requirements

These types of sensors generally require constant power to operate. The Hornet Nest Alarm Panel provides regulated 12V DC power at the dedicated +12V terminals. You can connect multiple sensors to a single power supply line, provided the total current draw remains within the safe limits of the panel's power budget.

Always calculate the total power consumption of your connected devices to avoid overloading the system.

- **Red** wire: +12V DC
- **Black** wire: Ground (GND)
- **Other wires (often yellow and green)**: Detection circuit

✅ All zone inputs on the Hornet Nest share a **common ground terminal** in adjacent zone pairs. Be sure to route your sensor grounds to the appropriate shared common terminal.



Zone Wiring and Tamper Circuits

Many motion and glass break sensors include **tamper protection switches**. These switches open the detection circuit if someone removes or opens the sensor housing.

In most cases, the sensor's **NC output** and **tamper switch** are wired **in series**—meaning that if either circuit opens, an alert is triggered. This configuration is fully compatible with the Hornet Nest and provides added security.

Example Configurations:

- **Detection Only**: NC contact loop between sensor output and zone input.
- **Detection + Tamper**: NC motion detection loop **in series** with NC tamper switch.

  If your device includes a red or blue jumper wire across two terminals (often marked as ALARM and TAMPER), this is likely a **resistor loop or shunt**.

  🔧 **If there is a built-in resistor or jumper wire:**
  - If the resistor value is **10kΩ or less**, you can leave it in place.
  - If the resistor is not desired, you may **remove it and replace it with a plain wire jumper** to preserve continuity.

Water Leak Sensors

Water leak detectors work similarly to contact sensors. Many models are **passive** and provide a **NC dry contact** that opens when water is detected. These can be connected directly to a Hornet Nest zone input.

Power requirements vary:

- Some are **powered** and require 12V DC.
- Others are **battery-operated** and completely passive.

For powered models, wire the +12V and GND as described above. Connect the detection output to any zone input and shared COM terminal.

6.5 4 WIRE SMOKE / HEAT / CO DETECTOR

4-wire smoke, heat, and carbon monoxide (CO) detectors are commonly used in low-voltage alarm systems and are well-supported by the Hornet Nest Alarm Panel. These detectors typically require continuous 12V power and provide a **Normally Open (NO)** or **Normally Closed (NC)** relay output to signal alarm or fault conditions.

> ⚠️
>
> **The Hornet Nest Alarm Panel is not certified or intended for use with life safety or critical fire detection systems where compliance with national or local fire codes is required. While the panel can interface with low-voltage smoke, heat, and CO detectors for notification purposes, it does not meet UL or NFPA standards for primary fire alarm systems.**
>
> **This product should not be relied upon as the sole means of life safety protection. For compliance with fire safety regulations, a dedicated and approved fire alarm system must be installed.**

🔎 **Note:** Unlike 2-wire detectors, 4-wire models separate the power circuit from the signal circuit. This gives greater control, particularly in systems like Hornet Nest, where remote power cycling is needed to reset alarm or trouble states.

Wiring 4-Wire Detectors

Typical Terminals:

- **+12V** – Power input
- **GND** – Ground reference
- **ALARM** – Relay output (NO or NC)
- **TAMPER / FAULT** (optional) – Used to indicate a cover tamper or internal fault

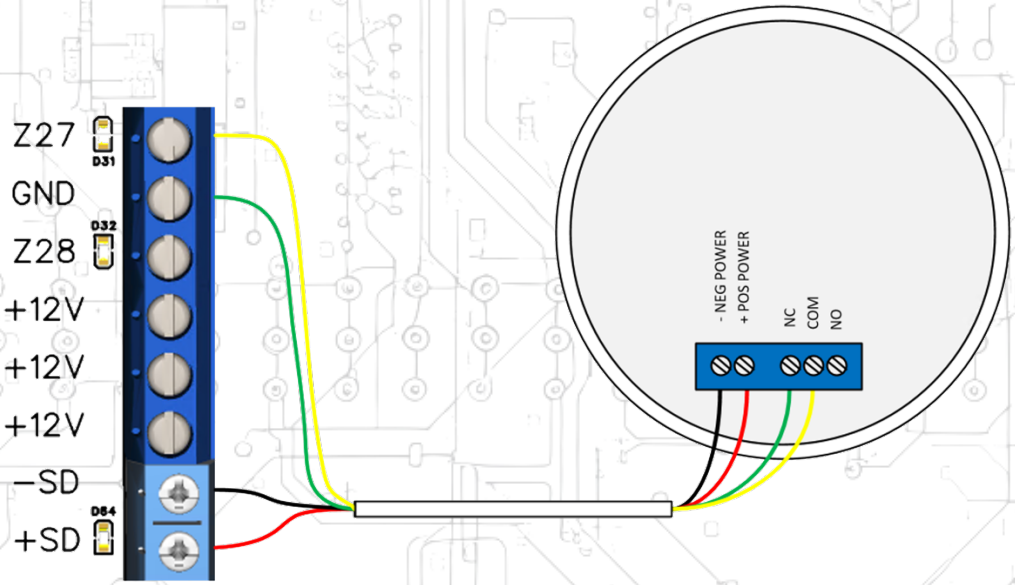
Each detector in a series must receive power and connect its output to a zone input. The Hornet Nest Alarm Panel offers dedicated and switchable 12V power for 4-wire detectors, allowing power to detectors to be programmatically or manually interrupted and restored—a requirement for resetting some smoke detectors after an alarm.

⚠️

Always calculate the total power consumption of your connected devices to avoid overloading the system.

Hornet Nest Wiring Notes:

- Use one of the two **12V outputs, labeled +SD**, to power your detectors.
- Connect the detector **GND** to the panel's **associated 12V ground, labeled -SD**.
- Wire the detector **ALARM relay** to any zone input and associated COM terminal.
- Multiple detectors can be **daisy-chained** on the same circuit, as long as:
    - Total current draw stays within the limits of the MOSFET output (typically up to 1A)
    - All detectors reset reliably when power is cycled



Resetting Detectors

Most 4-wire smoke and CO detectors require a brief power cycle to clear an alarm state once smoke or CO has dissipated. Simply acknowledging the alarm on your controller is not sufficient.

✅ The Hornet Nest Alarm Panel simplifies this process by allowing firmware-controlled reset of detectors via its **MOSFET-switched power channels**. This means detectors can be reset remotely—no manual unplugging or power disruption required.

You can configure ESPHome (or your preferred firmware) to momentarily disable the power output for a few seconds in response to a reset command.

6.6 OUTPUTS / SIRENS / STROBES / DOOR LATCHES

The Hornet Nest Alarm Panel provides several outputs that can be used to control powered security devices such as sirens, strobe lights, and electronic door latches. These devices are typically used to alert, deter, or restrict access during alarm events, and are commonly triggered using the onboard MOSFET-controlled outputs.

Supported Devices

- Piezo and Mechanical Sirens (12V DC)
- Flashing or Rotating Strobes
- Electronic Door Strikes or Magnetic Locks

Each of these outputs is capable of switching 12V DC power to your devices, but it's essential to ensure the total current draw across all outputs does not exceed the rated limits of the Hornet Nest board. Exceeding the power budget may result in overheating, voltage drops, or permanent damage to the panel or the wESP32 module.

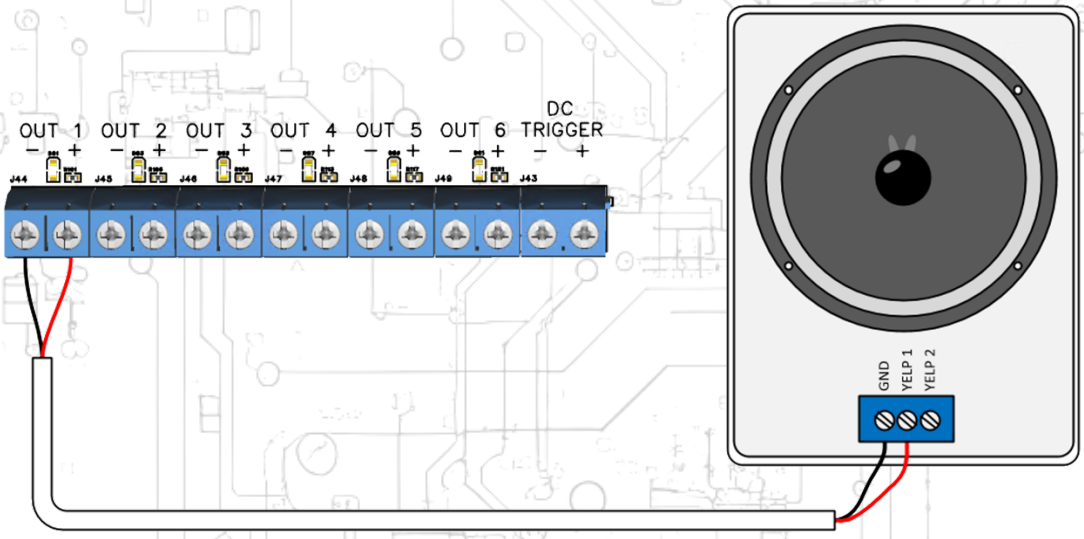
> ⚠
>
> **IMPORTANT:** Refer back to **Section 6.2 - Power** for details on calculating current load and understanding the total power budget of your system, **especially when using Power over Ethernet (PoE).**

General Wiring Guidelines

1. **Polarity Matters:** Most sirens and electronic locks are polarity-sensitive. Double-check your wiring to ensure correct positive and negative terminals are used.
2. **Current Consumption:** Confirm the rated current of your device. Piezo sirens typically draw 150-300 mA, while mechanical sirens and maglocks can exceed 1A.

Sample Wiring for a Siren or Strobe

- +12V Output (from MOSFET Output) → Positive terminal of device
- GND (from board common ground) → Negative terminal of device



6.7 TRIGGER INPUT

The Hornet Nest Alarm Panel includes a single **optically isolated 3–12V trigger input** designed to safely interface with external low-voltage signals. This input allows the system to respond to events or status changes from other electronic devices without introducing electrical noise or risking damage to either system.

How It Works

The input circuit uses an **opto-isolator** to detect DC voltage in the 3 to 12V range. When a compatible voltage is applied across the trigger input terminals (positive to TRIG+, ground to TRIG−), the internal opto-isolator activates, which is interpreted by the system firmware as an event or status signal.

Because this input is electrically isolated, it's ideal for integrating equipment that operates on a different voltage or ground reference. The trigger input is **read-only** and cannot be used to power external devices.

Example Use Cases in Security Applications

Here are some common scenarios where the trigger input might be useful:

- **Integration with Legacy Alarm Panels:** Monitor the "armed" or "alarm" output status of an existing alarm system to trigger automations or mirror status in a smart home dashboard.
- **Gate or Garage Door Controller Feedback:** Detect if a garage door is open or closed using an auxiliary 12V signal from a third-party controller.
- **Intercom Systems:** Capture a trigger signal from a doorbell or intercom system to activate lights, cameras, or log entries.
- **Access Control Devices:** Use the output from a Wiegand-based keypad or RFID reader to trigger automations when valid access is granted.

Wiring Instructions

Connect the **positive signal** from the external device to the **DC TRIGGER +** terminal and the **ground** to **DC TRIGGER −**. Ensure the signal falls between **3V and 12V DC**. Voltages outside this range may not be detected or could damage the input.

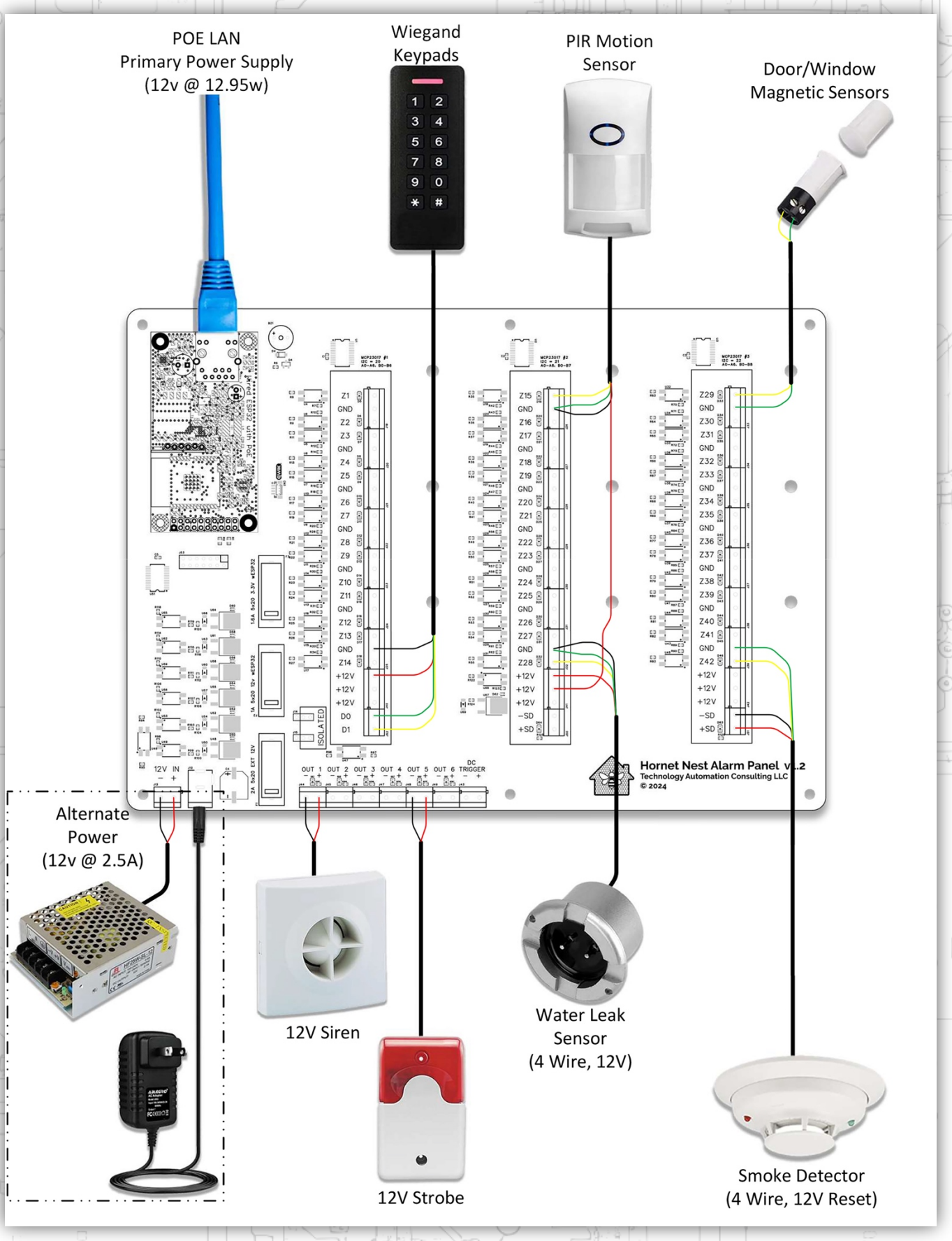
Important:

- This is a **low-voltage, logic-level signal input** only.
- Do **not** apply mains or high-voltage AC to this input.
- The input does **not** supply power—it only senses voltage on the line.

Compatibility Considerations

- The trigger input can be used with outputs from devices that offer a **logic-high signal** (3–12V).
- If the external device only provides a **relay output**, you can connect a pull-up resistor to 12V and the relay contacts across TRIG+ and TRIG− to simulate a voltage signal.

6.8 WIRING EXAMPLE OVERVIEW



7 COMMISIONING

7.1 FIRMWARE

Each Hornet Nest Alarm Panel ships pre-flashed with a lightweight version of ESPHome firmware, designed to establish initial network communication and streamline setup. While this firmware includes sensible defaults for most users, its primary function is to connect the board to your local network and initiate the full configuration process. **Upon first boot, the panel requires an active internet connection**—this allows it to reach out to GitHub, fetch the latest configuration packages, and automatically update itself using ESPHome's remote packages and dashboard import features. Ensuring internet access during this initial startup is essential to apply the most up-to-date settings and functionality.

Default Firmware Behavior

The pre-installed firmware is configured with the following defaults:

- **LAN Connectivity**: The board is expected to connect to your network via **Ethernet (via the wESP32)**. Wi-Fi is disabled by default.
- **Sensor Contact Type**: All digital zone inputs assume **Normally Closed (NC)** contact sensors. These are commonly used in traditional security systems to detect open doors, windows, or motion triggers.

These settings provide optimal compatibility with standard security wiring and allow for reliable detection of open circuits (e.g., a triggered sensor).

Custom Firmware Options

If your installation requires behavior that differs from the defaults (such as Normally Open contacts, Wi-Fi use, zone remapping, or integration with custom smart home platforms), you are encouraged to build your own firmware based on the open-source code provided.

The full source code, configuration, and documentation are available on GitHub:
🔗 https://github.com/taconsultingllc/hornet-nest-alarm-panel

You are free to clone the repository, make modifications to suit your unique needs, and upload custom firmware to the wESP32 using standard tools such as ESPHome or esptool.

Updating and Flashing

Firmware updates or customizations can be flashed via:

- USB-C (via the wESP32 programming header/module)
- Over-the-air (OTA), once the device is initially connected and configured on your network

Open Source Commitment

This firmware is open-source under the GNU General Public License and MIT License. Community contributions, bug reports, and improvements are welcome.
By providing access to the firmware source, we give you full control and transparency over how your Hornet Nest Alarm Panel operates, allowing it to seamlessly integrate with a wide range of smart home ecosystems.

7.2 ADD TO HOME ASSISTANT WITH ESPHOME

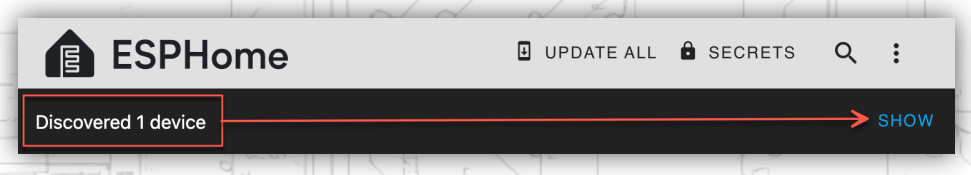
The Hornet Nest Alarm Panel integrates easily with **Home Assistant** using the **ESPHome** platform, giving you full visibility and control of your sensors, outputs, and zone states directly from your smart home dashboard.

Initial Setup in ESPHome

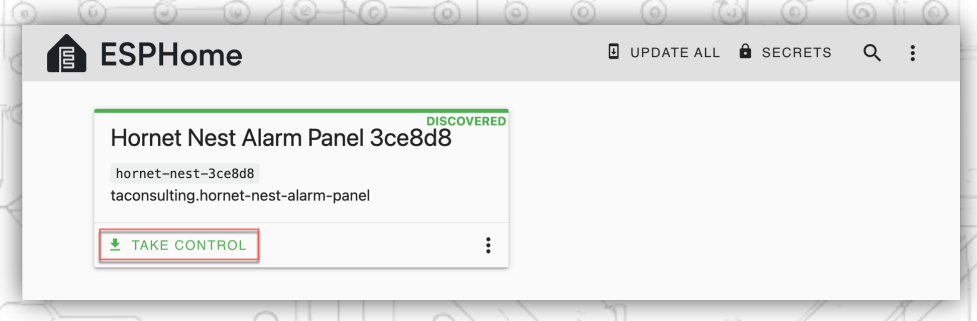
Before you can connect the Hornet Nest to Home Assistant, make sure the device is connected to your local network (via Ethernet by default) and powered up.
If you've installed the device on your LAN and it's running the pre-flashed firmware, ESPHome should automatically detect it once it comes online.

1. **Open ESPHome** – Navigate to the ESPHome dashboard from within Home Assistant.

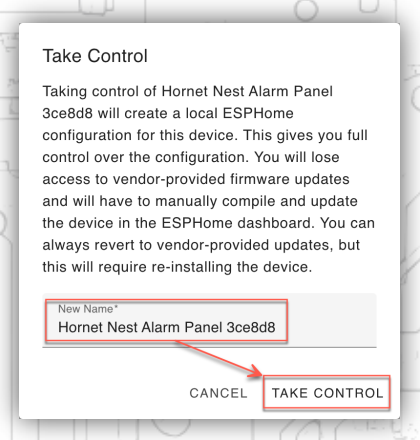
2. **Find the Discovered Device** – Look for the newly discovered Hornet Nest board, which will appear under the "DISCOVERED" section.



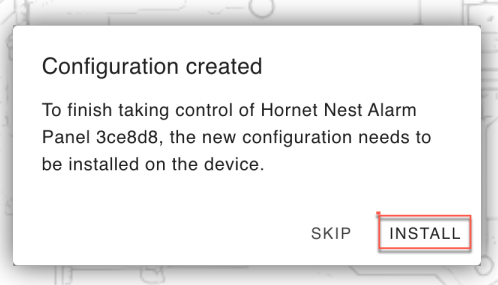
3. **Click "Take Control"** – Select the discovered device and click **TAKE CONTROL** to begin the adoption process.



4. **Rename the Device (Optional)** – If desired, update the device name to something descriptive (e.g., hornet_nest_front_porch). Click **TAKE CONTROL** again to continue.



5. **Install Configuration** – When the "CONFIGURATION CREATED" dialog appears, click **INSTALL** to compile and upload the full firmware to the device.



6. **Finish Installation** – Once the installation is complete and you see the **success** message in the log window, click **STOP** to finish.

✅ *Note: The board must be on the same local network as your Home Assistant instance to be automatically discovered.*

If the device doesn't show up automatically, you can manually add it using its IP address:

1. In Home Assistant, go to **Settings → Devices & Services → Add Integration**.
2. Search for and select **ESPHome**.
3. Enter the IP address of your Hornet Nest device.
4. Proceed through the configuration dialog.

Add the Hornet Nest Alarm Panel in Home Assistant

Once you've adopted the Hornet Nest board in ESPHome, it's time to add the device to Home Assistant. The process is simple and typically automatic:

1. **Check for Discovered Devices** – Open the **Notifications** pane in Home Assistant. If the Hornet Nest device is detected, you'll see a message about **New Devices Discovered**. Alternatively, navigate to **Settings > Devices & Services** to find new ESPHome devices.
2. **Locate the Hornet Nest** – The board will be listed as a discovered **ESPHome device**.
3. **Click Configure** – Follow the on-screen instructions to begin the integration process.
4. **Assign to an Area (Optional)** – You may assign the Hornet Nest device to a specific **Area** in your home (e.g., Garage, Utility Room, etc.). Click **Finish** to complete the setup.

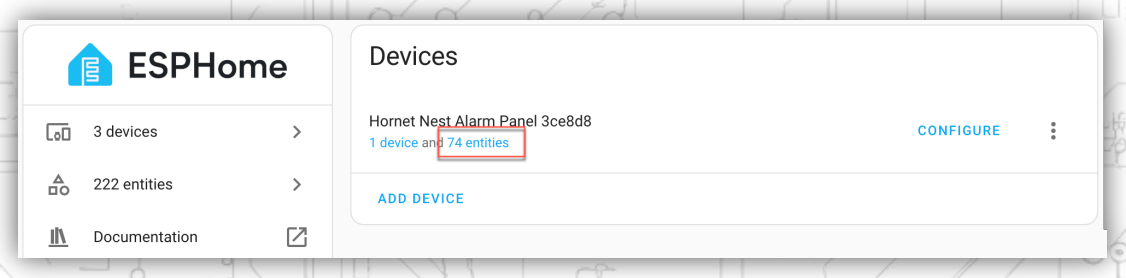
After completing these steps, the Hornet Nest device and all its associated zones will be available for use in Home Assistant. You can now begin creating automations, monitoring sensor status, and customizing your smart home system.

7.3 RENAME ZONES IN HOME ASSISTANT

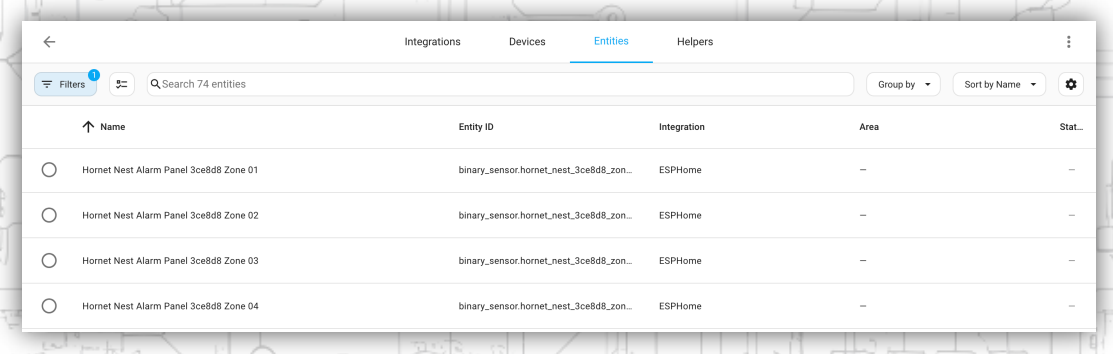
When first added to Home Assistant, all zones and outputs on the Hornet Nest Alarm Panel are listed with default, generic names such as “Zone 1”, “Zone 2”, “Output 1”, etc. These names can easily be customized within the Home Assistant user interface to better reflect your specific installation and improve clarity during automation setup.

Steps to Rename and Customize Entities

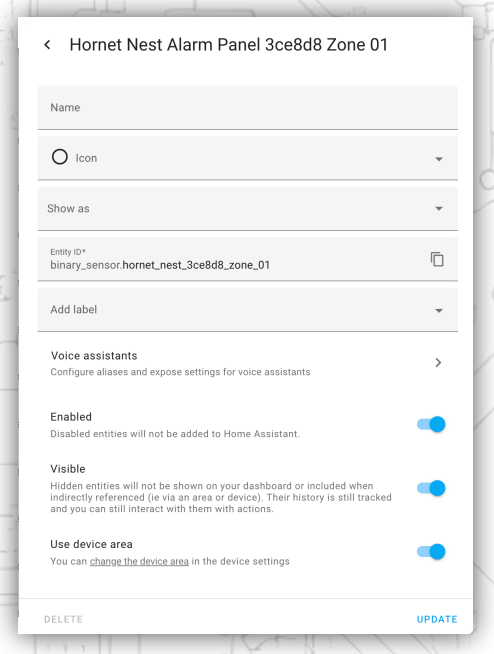
1. **Locate the Hornet Nest Device**
   On the Home Assistant **Integrations** page, find the ESPHome card that lists your Hornet Nest device. If you have multiple ESPHome or Hornet Nest panels, they will all appear here.
2. **View Device Entities**
   Click on the **Entities** link associated with your Hornet Nest device to display all related zones and outputs.



3. **Edit Entity Details**
   Click on each individual entity to rename it or customize its attributes such as icon, type, or visibility.



4. **Adjust Behavior and Appearance**
   Depending on the entity type (binary sensor, switch, etc.), you can configure how it appears and behaves in Home Assistant, including how it's displayed in dashboards or used in automations.



Entity Customization Options

Setting	Description
Name	Assign a descriptive name for the entity (e.g., *Front Door*, *Garage Motion*, *Living Room Window*).
Icon	(Optional) Set a custom icon for the entity. Leaving this blank will apply the default icon based on the entity type.
Show As	Choose the entity type that best matches the sensor's function (e.g., Door, Window, Motion). This determines the default icon and behavior.
Entity ID	This is the unique identifier used in automations, scenes, and dashboards (e.g., binary_sensor.front_door).
Entity Status	Set to **Disabled** to deactivate an unused zone. Set to **Hidden** to keep it active but remove it from auto-generated dashboards.
Change Area	Reassign the entity to a different area (e.g., *Basement*, *Second Floor*) than the Hornet Nest panel itself. Helpful for distributed sensor layouts.

Customizing your entities helps you get the most out of your smart security system, making it easier to build dashboards and automate notifications based on meaningful names and logical groupings.

8 SUPPLEMENTAL INFORMATION

8.1 ALARMO INTEGRATION

Alarmo is a powerful and user-friendly alarm system add-on for Home Assistant that provides a centralized interface to configure and manage your own DIY alarm system. It allows users to build a fully functional alarm experience using existing sensors, including those connected through the Hornet Nest panel, directly from the Home Assistant interface—no coding required.

Key Benefits

- **Browser-Based Configuration**
  All configuration is done via a built-in graphical interface—no need to manually edit YAML files. Easily configure zones, arming modes, entry/exit delays, and automation triggers.
- **Flexible Arming Modes**
  Alarmo supports Home, Away, and Night modes, allowing for tailored responses depending on your presence or routine.
- **Automation Integration**
  Works with Home Assistant automations to trigger sirens, send notifications, or integrate with other smart home devices (e.g., lights, locks, cameras).
- **User Management**
  Allows setting up individual PIN codes per user and even supports optional user notifications.
- **Custom Actions and Sounds**
  Configure pre-alarm beeps, exit countdowns, and visual cues using devices like sirens or strobes connected to the Hornet Nest panel.
- **Secure and Local**
  All logic runs locally in Home Assistant, with no reliance on the cloud or third-party services.

Installation Instructions

To install Alarmo:

1. In Home Assistant, navigate to **Settings > Add-ons**.
2. Click **Add-on Store**, then search for **Alarmo**.
3. Click on Alarmo and select **Install**.
4. Once installed, click **Start** to run the add-on.
5. Open the Alarmo dashboard via **Settings > Devices & Services > Alarmo** to begin configuration.

More information, documentation, and community support for Alarmo can be found on the official GitHub repository.

8.2 RING 2 KEYPADS

For those looking to add a physical arming/disarming interface to their security system, the **Ring Alarm Keypad v2** is an excellent choice. This Z-Wave-based keypad can be seamlessly integrated into Home Assistant and paired with the **Alarmo** add-on for an intuitive and reliable user experience.

Why Use the Ring Keypad v2?

The Ring Keypad v2 provides tactile control for arming and disarming Alarmo with user PINs, status lights, and sounds for visual and audible feedback. It adds a professional feel to any DIY security installation using the Hornet Nest Alarm Panel.

Step 1: Integrate Ring Keypad v2 with Home Assistant

The Ring Keypad communicates over Z-Wave and requires a Z-Wave controller to be installed and configured in Home Assistant. To integrate:

1. Ensure **Z-Wave JS** or **Z-Wave JS UI** is installed and running in Home Assistant.
2. Put the Ring Keypad v2 into pairing mode (press and hold the #1 button on the keypad for about 2 seconds) It's important to note that the keypad **MUST** be plugged into a wall charger to allow pairing.
3. Use the **Z-Wave integration** in Home Assistant to include the device into your Z-Wave network.
4. Home Assistant will automatically detect the Ring Keypad as a new device. Once added, the device will show up in your **Devices & Services** section.

Detailed integration and configuration steps can be found here:
👉 Ring Keypad v2 Integration Guide

Step 2: Add Sound and Feedback Capabilities

To make the most of the Ring Keypad, you can enable sound effects such as countdown beeps, entry chimes, and alerts triggered by Alarmo or automations.
To do this:

- Use Z-Wave service calls in Home Assistant to send commands to the keypad's sound endpoints.
- A community-driven resource demonstrates how to script these effects using **Z-Wave JS**.

Refer to this guide for examples:
🔊 Ring Keypad v2 Sound Integration

Step 3: Link with Alarmo

Once the Ring Keypad is recognized in Home Assistant:

- Open **Alarmo Settings** and go to **Users**.
- Assign PINs to users to allow keypad-based arming/disarming.
- Alarmo will automatically detect the keypad's input for arming mode changes.
- Use automations or Alarmo's built-in functions to synchronize alarm state with the keypad and trigger visual/audible feedback.

Final Notes

- The Ring Keypad requires USB power or internal battery operation.
- Ensure you test each arming mode (Home, Away, Night) to confirm the keypad and Alarmo respond properly.
- You can add multiple keypads across the home for convenient control.

By integrating the Ring Keypad v2 with Alarmo and the Hornet Nest Alarm Panel, you get the best of both smart and traditional alarm systems—local control, remote monitoring, and tactile access.

8.3 WIEGAND KEYPADS

The **Hornet Nest Alarm Panel** offers support for **Wiegand keypads**, a common standard used in commercial access control systems. These keypads are capable of reading RFID cards and accepting PIN input, making them ideal for integrating physical access points with your smart security setup.

What is Wiegand?

Wiegand is a communication protocol used primarily by keypads and RFID readers to send identification codes to a controller. It uses two data lines, **D0** and **D1**, and transmits bits serially. One of the most widely supported variants is **Wiegand 26-bit (WG26)**, which sends a total of 26 bits—typically composed of a facility code and a card number.
For more technical details on how Wiegand integration works with ESPHome, please refer to the ESPHome documentation:
🔗 ESPHome Wiegand Component

Important Notice – Experimental Support

Wiegand support on the Hornet Nest Alarm Panel is **experimental**. To enable Wiegand functionality, you **must create and load a custom ESPHome configuration (YAML)** onto the board. This is not supported out of the box with the default firmware.

- Users must be familiar with editing YAML in ESPHome and uploading via the Home Assistant ESPHome add-on.
- Support for various keypad models and features may vary.
- This functionality is intended for advanced users.

Setting Your Keypad to WG26 Mode

Many Wiegand-compatible keypads support multiple operating modes (such as 4-bit, 8-bit, or WG26). Refer to your keypad's instruction manual to set it to **Wiegand 26-bit mode (WG26)**. This often involves DIP switches or configuration commands sent via the keypad. Consult the device's manual for instructions.

9 DOCUMENT REVISION HISTORY

Version	Date	Author	Description of Changes
1.0	2025-05-21	Christopher Greenlee	Initial release of user manual for Hornet Nest Alarm Panel.